

Remarks/Arguments

This Amendment modifies the claims in this application by canceling Claim 4 and amending Claims 27 and 28. Consequently, Claims 23, 24, 27, and 28 are pending. Claim 27 is independent; Claims 23, 24, and 28 are dependent.

Claim Rejection under 35 USC § 103

Unlike Okamoto (U.S. Patent No. 4,933,650), the applicant's claimed gas detector includes a radial resonator or transformer. Also, the applicant's claimed gas detector includes a discharge tube in which gas is carried for conversion to plasma and an enclosed passageway surrounding such tube. The enclosed passageway carries cooling air that comes in contact with the outer surface of the discharge tube. The resonator has a chamber without an outlet that encircles the discharge tube and the enclosed passageway and that is located before the outlet of the discharge tube. When the resonator is energized with sufficient amount of radio or microwave energy, the energy generates plasma in the discharge tube without affecting the cooling air.

The microwave plasma production apparatus of Okamoto discloses the use of a coaxial resonator or transformer. Column 5, lines 22-23 states that in the diagram [Fig. 5] the reference numeral 50 denotes a coaxial wave guide transformer. As can be seen from Fig. 5, the wave-guide transformer 50 has an outlet thorough which the discharge tube 80 extends. Further, within the chamber of the transformer 50 there is an inner conductor 51 that terminates with a gap "d" before the outlet. When the microwave plasma production apparatus of Okamoto is energized, microwave energy is concentrated by the configuration of the elements at the outlet, which requires the inner conductor 51 with the gap "d". The concentrated microwave energy produces diffused plasma 800 and hot plasma 701 at the outlet.

As indicated above, unlike Okamoto, the applicant's claimed gas detector uses a radial resonator - not a coaxial resonator. The radial resonator of applicant's gas detector does not require a gap to concentrate radio or microwave energy. It is known that radio frequency or microwave energy of a radial resonator is concentrated at the center. Okamoto does not teach or suggest such an arrangement.

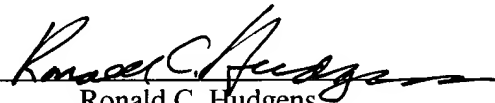
Further, because Okamoto's coaxial resonator requires the termination of the inner conductor with the gap "d" before its outlet, cooling gas will escape through Okamoto's outlet and may even escape down the passageway of transformer 50. This could produce uneven cooling of the discharge tube 80. By contrast, the cooling air flows evenly in applicant's gas detector because the applicant's radial resonator does not outlet and the passageway surrounding the discharge tube thorough which cooling air moves is enclosed.

In view of the foregoing, it is believed that this Amendment overcomes all of the rejections and that the claims in the application clearly and patentably distinguish over all of the cited references, either alone or in combination. Therefore, the Examiner's reconsideration and favorable action are hereby respectfully requested.

Respectfully submitted,

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